the upper and middle waters of the North Pacific, and no severe disturbances seem to have occurred in the tropics. The regions over which the principal gales of the month occurred may be grouped as follows: One lying immediately south of Japan; another stretching southwestward from the western Aleutians well toward northern Japan; a third running closely along the American coast between Vancouver Island and about Point Conception, Calif.

The gales in lower Japanese waters were mostly caused by two cyclones which came from the Asiatic mainland near the middle of the month. The earlier passed along the lower coasts of the islands and caused strong to whole gales on the 12th. The second cyclone at time of greatest intensity was central over the Japan Sea on on the 15th, during which day gales with force as high as 11 occurred in the southern quadrants east of Kiushu Island. On the 23d, in connection with another cyclone over the Archipelago, a whole southeast gale was reported near the east coast of Honshu.

For that portion of the upper steamship routes lying southwest of the Aleutians the principal gale period embraced the 9th to 11th, with local maximum wind forces of 9 and 10 on the 9th. On other days scattered gales were encountered by steamships, but none was reported as exceeding force 8.

In the American coastal region northerly to westerly gales occurred on the 7th to 9th, and again on the 17th to 19th. In the earlier period the high velocities were due to the steep pressure gradients on the eastern slope of the Pacific anticyclone impinging upon a LOW, the western side of which bordered on the coast. At this time the strongest gale reported was of force 9, experienced about 100 miles west of San Francisco. In the second period there was a strong concentration of the ocean HIGH off the Washington and Oregon coasts, and in consequence of steep gradients east of the crest anticyclonic gales of force 8 to 10 roughened the weather off Oregon and the upper half of California, with moderate gales (force 7) covering a wider range of sea.

The only severe gale mentioned for the entire ocean area apart from the regions noted was a southwesterly wind of storm force (11) reported on the 8th in approximately 47° N., 154° W., this locality being at the time under the influence of the Aleutian disturbance.

Winds at Honolulu.—At Honolulu the prevailing direction of the wind during May was from the northeast, with maximim velocity 25 miles from the east on the 4th. An unusually large number of *konas*, or southerly winds, was reported.

Fog.—Fog showed a distinct increase in frequency over that of April throughout the western part of the upper routes. It was reported on 20 days for the whole region between latitudes 40° and 50° N., and longitude 180° and the Japanese coast. It was most frequent between longitudes 150° and 170° E., where it formed in some 5-degree localities on approximately one-third of the days of the month. East of 180°, in these latitudes, fog occurrence diminished to three or less days per 5-degree square, except east of 160° W., where it became slightly more frequent. Between 40° and 45° N., 130° and 140° W., the whole area seems to have been mantled in fog during the first five days. Between Tatoosh Island and San Diego, 10 to 20 per cent of the days had fog, the highest percentage forming near the coast below San Francisco.

BUCKET OBSERVATIONS OF SEA-SURFACE TEMPERATURES

By GILES SLOCUM

STRAITS OF FLORIDA AND CARIBBEAN SEA

The temperatures herein published are the means of the average temperatures for the four quarters of the month, except that, in the case of the 5-degree subdivisions of the Caribbean Sea, the figures shown are the simple means of the observed temperatures with the entire month taken as a unit. Table 1 shows the lengths of the quarters for each length of month.

Table 2 shows the average temperature for the Caribbean Sea and the Straits of Florida for May of each year from 1919 to 1930, inclusive, and Table 3 summarizes the temperature for the month in the same areas, including the departures of the May, 1930, means from the 11-year means for May, 1920–1930, and the changes from the temperatures, for the preceding month of April, 1930.

The chart shows the number of observations taken during the month of May, 1930, within each 1-degree square; the mean temperature of the Straits of Florida, and of each 5-degree[1] subdivision of the Caribbean Sea; the 11-year means (1920–1930) for these areas; and the local mean time corresponding to Greenwich mean noon, at which time the mariners are instructed to make the temperature readings.

May is a month of rapid warming of the surface water in the Straits of Florida, being second only to June in this respect, while in the Caribbean Sea, the greatest upward change in the temperature takes place, on the average, during this month. The amount of this rise in temperature averages somewhat more than 1° in the Caribbean Sea, and nearly 2½° in the Straits of Florida.

During May the principal discharge from the Caribbean Sea, at the Yucatan Channel, begins to follow summer tracks, with relatively little of the water taking the direct route north of Cuba and out the Straits of Florida. A considerable bulk of the water makes instead a circuit of the entire Gulf of Mexico. Summer conditions have begun to prevail in the Mexican and Gulf States littoral, and consequently, the near-by land is slightly warmer than the sea currents over most of the route.

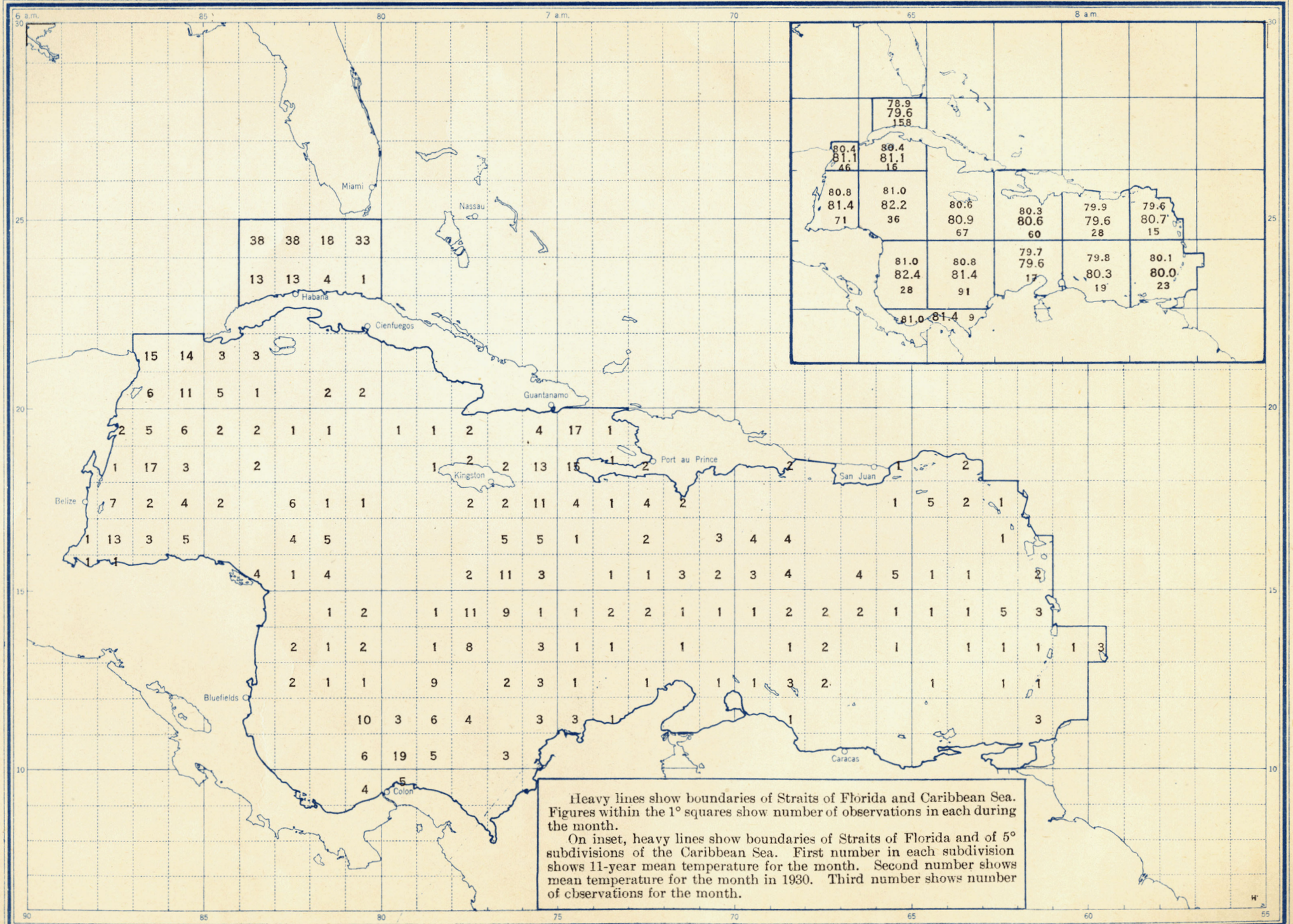
The water from the Caribbean, mixed with that from more local Gulf currents, finally approaches the vicinity of the Straits of Florida from the west and northwest, having been flowing at all times during the circuit, with relatively low velocity. Examination of current charts indicates that the rates of flow during May are such that the currents setting north and northwest from the Yucatan Channel at this time can hardly complete more than a minor fraction of their circuit in a month; it is therefore presumable that in the latter part of May and in early June, the current through the Straits of Florida may normally contain a minimum of direct flow from the Caribbean through the Yucatan Channel past the northwestern coast of Cuba.

Temperatures were somewhat above the average, during the month of May, 1930, in the region immediately southwest of the Leeward Islands and generally in the Caribbean Sea west of 75° W., and approximately

[1] In three cases, as indicated on the chart, the observations from small, little traveled, and unimportant areas at the outer limits of the Caribbean Sea have been treated as parts of contiguous 5-degree subdivisions.

Distribution of Greenwich Mean Noon Bucket Observations of Sea-Surface Temperatures, May, 1930

(Plotted by Giles Slocum)



Heavy lines show boundaries of Straits of Florida and Caribbean Sea. Figures within the 1° squares show number of observations in each during the month.

On inset, heavy lines show boundaries of Straits of Florida and of 5° subdivisions of the Caribbean Sea. First number in each subdivision shows 11-year mean temperature for the month. Second number shows mean temperature for the month in 1930. Third number shows number of observations for the month.

average for the region about the Windward Islands and between Haiti and Porto Rico on the north, and the South American coast on the south, making the Caribbean Sea, as a whole, warmer than the 11-year mean at all times during the month.

TABLE 1.—*Lengths of "quarter months" used in computing mean sea-surface temperatures*

Length of month	Days of month included in quarter			
	I	II	III	IV
28 days	1–7	8–14	15–21	22–28
29 days	1–7	8–14	15–21	22–29
30 days	1–7	8–15	16–22	23–30
31 days	1–7	8–15	16–23	24–31

TABLE 2.—*Mean sea-surface temperatures in the Caribbean Sea and the Straits of Florida for May, 1919–1930*

Year	Caribbean Sea		Straits of Florida	
	Number of observations	Mean temperature	Number of observations	Mean temperature
1919 [1]	44	81.0	12	77.7
1920	180	80.2	32	78.6
1921	173	79.8	44	77.4
1922	190	79.8	76	79.2
1923	393	80.0	107	78.8
1924	328	81.1	108	79.0
1925	362	80.4	137	79.0
1926	355	81.3	124	79.0
1927	462	81.2	160	79.7
1928	380	80.7	143	77.6
1929	483	79.9	146	79.8
1930	526	81.0	158	79.6
Mean (1920–1930)	----------	80.5	----------	78.9

[1] Not used in computations because of insufficient data available.

The Florida Straits were also warmer than the average. Particularly noticeable was a protracted period, beginning with the second quarter of April and persisting throughout May, in which the mean temperature showed a rapid, uninterrupted, and remarkably uniform rise. Because of the rapidity of this rise, there was a rather extreme contrast between the temperature of any given quarter in May and the corresponding part of April.

TABLE 3.—*Mean sea-surface temperatures (°F.), and number of observations, May, 1930*

Quarter	Period	Caribbean Sea				Straits of Florida			
		Number of observations	Mean	Departure from 11-year mean (1920–1930)	Change from preceding month	Number of observations	Mean	Departure from 11-year mean (1920–1930)	Change from preceding month
			°F.	°F.	°F.		°F.	°F.	°F.
I	May 1–7	128	80.7	----------	----------	39	78.3	----------	----------
II	May 8–15	122	81.1	----------	----------	43	79.1	----------	----------
III	May 16–22	165	81.2	----------	----------	36	80.2	----------	----------
IV	May 23–31	111	81.2	----------	----------	40	81.0	----------	----------
Month	----------	526	81.0	+0.5	+1.6	158	79.6	+0.7	+3.1